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SCIENTIFIC LETTER

# Ventilator Associated Pneumonia (VAP) in Neonatal Intensive Care Unit — An Emerging Problem

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*To the Editor:* Ventilator Associated Pneumonia (VAP), especially with multiresistant organisms has been increasing in the Neonatal Intensive Care Units (NICU) [1–5]. There are few published data from India.

In this retrospective observational study, medical case records of neonates who required mechanical ventilation for >48 h were evaluated to determine the incidence, risk factors, morbidity and mortality of VAP in the NICU of Institute of Child Health, Chennai, India between January 1 and October 31, 2007. VAP was diagnosed using the Center for Disease Control and Prevention (CDC) criteria for diagnosis of *clinically defined nosocomial pneumonia* in infants. The criteria includes: Worsening gas exchange, increasing oxygen requirements, or increasing ventilator settings *and at least three* of the following: temperature instability; leukopenia or leukocytosis and left shift; increasing respiratory secretions or increasing suctioning requirements; apnea, tachypnea, nasal flaring with retraction of chest wall or grunting; wheezing, rales, or rhonchi; bradycardia or tachycardia *and two or more* serial chest radiographs *with at least one* of the following: new or progressive and persistent infiltrate; consolidation; cavitation; pneumatoceles.

Of the 265 mechanically ventilated neonates enrolled in the study, 135 neonates entered the study cohort. The incidence of VAP was 22.22 cases per 100 mechanically ventilated neonates. Klebsiella (66.67%) was the predominant organism isolated from the lower respiratory tract specimen (LRT) collected through the endotracheal tube. Home delivery, respiratory distress at admission, unstable cardiopulmonary assessment at admission defined as *atleast one of the following*: unstable airway/abnormal breathing/abnormal circulation/altered mental status, repeated intubations (more than 1), prolonged ventilation, prolonged duration of hospitalization and level III stay were found to significant risk factors for VAP by univariate analysis. Factors that retained significance in multivariate logistic regression model were unstable initial cardio pulmonary assessment ($p$ value=0.010, adjusted OR: 0.2, 95% CI: 0.0,0.6) and repeated intubations ($p$ value, 0.001, adjusted OR: 34.3, 95 % CI: 8.3,142.4). The mortality rates for the neonates with VAP was 50% and for those without VAP was 69.5 % ($p$ value=0.030).

VAP is a serious nosocomial infection. Preventable risk factors should be addressed in all neonatal units. Further research is necessary to formulate the guidelines for diagnosis of VAP in neonates.

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## References

1. Goldsmith JP, Edward HK. In: Assisted ventilation of the neonate. Chapter 24, 5th ed. Saunders: Elsevier; 2011. p. 426–35.
2. McGrath EJ, Asmar BI. Nosocomial infections and multidrug-resistant bacterial organisms in the pediatric intensive care unit. Indian J Pediatr. 2011;78:176-84.
3. Apisarnthanarak A, Holzmann-Pazgal G, Hamvas A, Olsen MA, Fraser VJ. Ventilator associated pneumonia in extremely preterm neonates in a neonatal intensive care unit: characteristrics, risk factors, and outcomes. Pediatrics. 2003;112:1283–9.
4. Petdachai W. Ventilator-associated pneumonia in a new born intensive care unit. Southeast Asian J Trop Med Public Health. 2004;35:724–9.
5. Foglia E, Meier MD, Edward A. Ventilator-associated pneumonia in neonatal and pediatric intensive care unit patients. Clin Microbiol Rev. 2007;20:409–25.

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